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ABSTRACT

Providing relevant data, analyses, and observations, with particular reference to the cognitive and affective development of bilingual children, the 1973-74 Grants Bilingual-Bicultural Program evaluation determined the personnel's attitudes and perceptions about program components and operations and the children's responses to bilingual-bicultural instruction. Native American, Anglo, and Spanish surnamed children from 9 classroom groups (6 program and 3 non-program) in grades 1, 3, and 5 comprised the sample. Tests administered in Spanish and English, a 30 item questionnaire, and classroom observations were used. Due to the lack of tests in Native American dialects, reference to observations of Native American cultural features in the program was made rather than to cognitive achievement based on the tests. Tests included the Inter-American Series' Tests of Reading, the General Ability Test (Spanish version), and the Science Research Associates, Inc. (SRA) Achievement Series, Form E/Blue Level and the Primary Edition, Form E, Primary I and II. Some findings were: students gained significantly in oral vocabulary, numbers, general concepts, and cognitive processes based on verbal and pictorial stimuli in Spanish; 3rd grade students measured at or beyond grade level on the SRA Test; and the personnel felt the program was well coordinated, sufficiently supplied with materials and equipment, and effective in developing the children's bilingual ability and cognitive skills. (NQ)

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THE COGNITIVE AND AFFECTIVE DEVELOPMENT OF ELEMENTARY SCHOOL CHILDREN IN A BILINGUAL-BICULTURAL LEARNING ENVIRONMENT

A Study of the Grants Bilingual-Bicultural Education Program, Grants, New Mexico

June--1974

by

Dr. Atilano A. Valencia
Consultant

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TABLE OF CONTENTS

I. INTRODUCTION....1

II. RESEARCH DESIGN....2

Cost Factors and Constraints in Research Design....2
Statistical Design....3
Sampling Groups....4
Inter-American Test Series....6
SRA Test Series....6

III. STATISTICAL FINDINGS....7

Language and Cognitive Development in Spanish....7
Achievement in Arithmetic, Reading and Language Arts Based in English....13
Personnel Perceptions and Attitudes About the Program....17

IV. SUMMARY AND RECOMMENDATIONS....20

APPENDICES:

TABLE I: Spanish Language Reading Achievement.

TABLE II: Spanish Language Achievement in Oral Vocabulary, Numbers, Associations, and Classifications.

TABLE III: Third Grade (English) Achievement in Reading, Language Arts, and Mathematics.

TABLE IV: Fifth Grade (English) Achievement in Reading, Language Arts, and Mathematics.

TABLE V: Comparative (English) Achievement of Program and Non-Program First Grade Children in Reading, Language Grammar, and Mathematics.

TABLE VI: Comparative (English) Achievement of Program and Non-Program Third Grade Children in Reading, Language Grammar, and Mathematics.

TABLE VII: Comparative (Enlish) Achievement of Program and Non-Program Fifth Grade Children in Reading, Language Arts, Vocabulary, Mathematics, Social Studies, and Science.

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I. INTRODUCTION

This evaluation study was undertaken for the purpose of providing program personnel with relevant data, analyses, and observations about the Grants Bilingual-Bicultural Program, with particular reference to programmatic effects relative to the cognitive and affective development of bilingual children. In addition to tests administered in Spanish and English, the study included a questionnaire and classroom observations to determine perceptions and attitudes of program personnel toward program components and operations, as well as children's responses to bilingual-bicultural instruction.

As was true of previous evaluation studies of this program, this study was not especially designed to prove or disprove research hypotheses that educators or researchers, in general, may be raising about selected variables in bilingual-bicultural education. Any hypotheses in this study are for the purpose of ascertaining programmatic effects relative to children in the Grants Bilingual-Bicultural Program which, in turn, will serve as a reference base for program modification or expansion. Yet, it is possible that this study will contain noteworthy data for educators and researchers in the field. To this extent, the study will contribute to the dissemination of significant findings relative to bilingual-bicultural education.

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II. RESEARCH DESIGN

Cost Factors and Constraints in Research Design

As bilingual-bicultural programs continue to expand, the cost factor in evaluation becomes relatively greater. Unless additional dollars are provided for evaluation studies, the research design must be conceptualized to include only a selected number of programmatic features. Whereas in a first-year program an evaluation study may include all of the First Grade children in the bilingual-bicultural program, it would not be financially feasible to include all of the program children in a fifth-year program. And where one or more features in a study have proven costly beyond budgetary allocations, they either have to be reduced or deleted in a subsequent study. For example, a series of classroom observations and analyses of all classrooms in the project by bilingual-bicultural experts is a costly undertaking.

Longitudinal comparisons, where data from subsequent years are compared with current data, require a multiplicity of analyses and additional dollars. Analyses to compare achievement differences between grade levels also prove costly as more and more grade levels are included in the program. Where budgetary allocations for evaluation remain constant or are reduced, it is necessary to design the study in terms of reduced sampling groups;

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this can be applied in reference to the "n" factor or in the number of program and non-program groups. Where this becomes necessary some losses are anticipated. And where a reduction in the number of participating groups is affected, data in reference to differences in classroom and school environments may not be ideally represented.

The foregoing statements of cost are given to illustrate that degree of sophistication in a research or an evaluation task is highly dependent on bugetary allocations. The research design for this evaluation study is based on what the evaluator considers to be financially feasible. It is understood that a more comprehensive and sophisticated research design would be possible under increased financial resources.

Statistical Design

The research design was conceptualized with particular consideration for Grants program personnel. The statistical analyses plan was designed to provide, as nearly as possible, interpretative and meaningful data for the intended reader. Wherever possible, gain scores (percentage-based or grade-level equivalencies) and mean differences between program and non-program groups were tabulated, analyzed and reported. Probability analyses were not used in this year's study.

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Sampling Groups

The evaluation study included the following schools, grade levels, and classifications:

Schools	Grades	Cultural Characteristic
San Rafael	1, 3, 5	Spanish Language Dominant English Language Dominant
Sierra Vista	1, 3, 5	Spanish Language Dominant English Language Dominant
Cubero	1, 3, 5	Spanish, English and Laguna-Acoma
Mesa View	1, 3, 5 (Control Groups)	Spanish Language Dominant English Language Dominant

Because of the low number of native American children in all of the aforementioned schools, observations of activities relative to cultural elements of these students were considered only in reference to the Cubero School. A low number of Anglo surnamed children is found in all of the classes. Where the number of this sampling group is below 5, it was either included in the entire classroom sample (where a cultural difference relative to a research variable was not apparent) or excluded (where a cultural difference in a test variable, i.e., Spanish in Grade level 1, was apparent).

It may appear from the statistical data that the evaluation design was especially planned for Spanish-surnamed children. The

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high representation of this group tends to reflect this observation; however,this representation is attributed to the fact that the majority of students in the Grants schools are from Spanish surnamed parents.

A sampling of Native American children was not included in the test sessions of this study. There presently are no available tests in the Native American dialects of children in the Grants schools. Therefore, the study has given reference to observations of Native American cultural features in the program rather than to cognitive achievement based on test instruments. It is recommended, however, that this type of testing be extended in future evaluation studies, with particular reference to criterion tests developed by program personnel.

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Inter-American Test Series

The Tests of Reading in the Inter-American Series are designed to measure both reading vocabulary and comprehension. The tests cover the range from the preschool level through high school and are issued in parallel English and Spanish editions. The Spanish edition was used to measure the reading ability of a sample of students in the Grants Bilingual-Bicultural Education Program, grades 1, 3, and 5. Additionally, the General Ability Test (Spanish version) was administered to children in the program to ascertain achievement in oral vocabulary, numerical concepts, and associations and classifications.

SRA Test Series

The SRA (Science Research Associates, Inc.) Achievement Series, Form E/Blue Level, was given to program children in Grade 5. The purpose of this test is to ascertain (English) achievement in mathematics, social studies, and science.

The Primary Edition, Form E, Primary I and II, was given to program children in grades 1 and 3 to determine (English) achievement in reading, language arts, and mathematics.

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III. STATISTICAL FINDINGS

Language and Cognitive Development in Spanish

Two bilingual education objectives were referred to in conceptualizing the Spanish language component of the research design. First, the testing process included an assessment of Spanish language development, particularly in reading and vocabulary. Second, it included achievement measures in Spanish oral vocabulary, numerical, associations and classifications.

In previous evaluation studies, the Test of Basic Experiences was used to determine the Spanish language development and knowledge gain in mathematics, science, and social science of program students. Since this test has been used several times with students in the program, one of the recommendations in the 1972-73 evaluation study was to use a different Spanish language test. Additionally, a Spanish language test that would specifically measure reading achievement was desired. It was on this basis that the Inter-American Series (Spanish version) was selected for this year's evaluation study.

The Inter-American Tests are recommended for use primarily with regional or local norms to be prepared by those who use the test.[1] The publisher provides a limited number of tables.

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[1] Technical Report--Tests of General Ability and Tests of Reading--Inter-American Series Forms CE, DE, CEs, DEs. Guidance Testing Association, Austin, Texas, 1976, p. 63.

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Some are based on results found by users of the test and others are founded on test construction projects or other research. The publishers suggest that users of the test should apply norms, for the Spanish language variance among Spanish speaking groups throughout the nation is a significant variable. For example, a table of norms based on Spanish speakers in Miami Beach, New York, Texas, etc., may not be appropriate for Spanish surnamed students in New Mexico. For this reason, mean percentage scores have been computed to ascertain degree of knowledge acquired in Spanish or subject-matter concepts (in Spanish) among program students in grades 1, 3, and 5. These percentage scores were computed in comparison to the total number of possible points in the test. Since the scores are based on post-test data (a pre-test design was not used due to budgetary limitations), the results are given to indicate relative knowledge in reference to Spanish language variables (vocabulary and reading) and subject-matter concepts (in Spanish) as compared to total possible points in the test.

An attempt was extended to test students in Spanish in the Mesa View (control group) school; however, this was not pursued in terms of analyses. The obvious results would have

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shown significantly higher scores for program students in reference to Spanish language variables. This has already been proven in the past four years of study, and the statistical findings would have merely reflected a redundancy in reporting. On the other hand, control group testing was carried in terms of the SRA. The purpose in administering the latter was to ascertain any comparative losses, gains, or consistencies in achievement level (English based) between program and non-program students.

Table I in the Appendices illustrates the group means of program children in grades one and two (San Rafael and Sierra Vista Schools). Two language arts variables were measured in terms of the Inter-American Test Series--reading vocabulary and reading comprehension rate. The percentage scores were 35 and 58 in reading vocabulary and 28 and 58.5 in reading comprehension (comprehension level and rate combined) among First Grade students in the two schools. Since the test content was conceptualized by Spanish speaking persons in a different part of the country, it was expected that a difference between test content and reading content would be found. Yet, it is noteworthy that First Grade students in the program scored between 28-58 percent in vocabulary and reading comprehension in unfamiliar test content.

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Third Grade students scored 31.3 to 75.0 percent in reading comprehension level, 19.8 to 44.2 percent in reading comprehension rate, and 25.0 to 56.8 percent in reading vocabulary. In computing a combined score for reading comprehension level and reading comprehension rate, achievement for Third Grade students would be comparable to achievement found among First Grade program students. And in reading vocabulary the difference at the lower end of the comparative analysis was only 5 percentage points. Therefore, similar conclusions to those given for First Grade students may be stated for Third Grade students in the program.

Percentage scores in reading for Fifth Grade students were relatively lower as compared to First Grade and Third Grade students. The reading content in the Inter-American Test Series appears progressively more difficult at more advanced levels, and it is conceivable that Spanish-speaking children in New Mexico are not as advanced (originally) in Spanish vocabulary and language fluency as compared to Puerto Rican and Cuban children who have recently migrated from their native lands or whose parents use a more advanced Spanish vocabulary with them. This finding supports the notion that acceleration in language development is dependent on degree and frequency of exposure to the language in both school and home environments.

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In previous evaluation studies, students in the Grants Bilingual-bicultural Education Program were observed reading orally and responding to questions relative to reading content. Some conclusions were drawn in reference to reading rate and comprehension; however, further testing was suggested to substantiate these findings. The statistical findings in this study give further evidence that students in the Grants Bilingual-Bicultural Education Program are reading and comprehending what they read. It is highly recommended that program teachers construct criterion tests to measure individual variances in reading rate and comprehension, with particular reference to progressively higher reading levels. These data could then be made available to the evaluator for statistical analyses. In this way, test content would be closely related to actual reading content and program objectives.

The Inter-American Test of General Ability was administered to First Grade Program students in the San Rafael and Sierra Vista Elementary Schools. This test consists of four parts: I, Oral Vocabulary; II, Numerical; III, Associations; and IV, Classifications. Part I gives reference to linguistic ability in oral vocabulary, with the student providing words and expressions to pictorials presented by the examiner. Part II simply provides a measure of numerical ability, with the

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examiner dictating the exercises. Part III requires that the student makes a corresponding comparison between two sets of pictorials; and Part IV requires that the student differentiates between one pictorial as compared to several drawings. This test is a combination of verbal and visual stimuli extended by the examiner, which allows the student to respond and apply cognitive and linguistic processes. First Grade students in the San Rafael and Sierra Vista Schools scored exceptionally well in all four test variables. In reference to Table II in the Appendices, it is noted that First Grade students in the San Rafael School scored 56.4 in Oral Vocabulary, 80.7 in Numbers, 69.5 in Associations and 62.0 in Classifications (based on percentage terms). And First Grade students in the Sierra Vista School scored 68.0 in Oral Vocabulary, 58.0 in Numbers, 84.5 in Associations, and 67.5 in Classifications (based on percentage terms). These findings clearly show that First Grade Students in the Grants Bilingual-Bicultural Education Programs have advanced significantly in vocabulary related to general concepts and cognitive processes (associations and classifications) in terms of verbal and pictorial stimuli given in Spanish. The findings based on this test also give further credence to the relationship of test design to content in reference to growth and development concepts at various age

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levels, as well as to the type of stimuli and learning processes that children have experienced in the instructional program. Classroom observations provided evidence that teachers in the program are using verbal and pictoral stimuli in Spanish very effectively in advancing the oral language ability and cognitive skills of children in the program. The statistical findings, based on the Inter-American General Abilities Test, give substantial support to previous observational reports on instructional effectiveness in the abovementioned variables. No further testing of this type was extended to other grade levels because of budgetary limitations; however, classroom observations revealed that teachers in other grade levels also use verbal interaction and multi-stimuli in advancing the Spanish language and cognitive skills of children in the program.

Achievement in Arithmetic, Reading and Language Arts Based in Engli

The SRA Test for Third Grade students was administered to ascertain achievement in reading, language grammar, and mathematics concepts based in English. Table III shows statistical data in terms of a pre-/post-test analysis, with reference to mean grade level attainment in the Spring of 1973 as compared to the Spring of 1974. Excellent grade level gains were noted among the children tested in the San Rafael School, with readings recorded

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between 1.3 and 2.1. All of the Third Grade children tested measured at or beyond grade level in terms of the SRA post-test. Grade level gains among children in the Sierra Vista School were noted between .7 and 1.0. Because of the low "n" among Anglo surnamed children, means for this group were not obtained. Therefore, the grade level readings for the Sierra Vista School were given principally in reference to Spanish surnamed children. Since the sampling group in the Sierra Vista group was twice as large as compared to the San Rafael group, a greater variance in Standard Deviation was expected. Nevertheless, it is highly suggested that program personnel review other test data or administer additional tests in the Fall of 1974 to clearly establish grade level equivalencies for these children. It is also suggested that program children in all of the schools be given reading, language grammar, and arithmetic tests in the Fall to ascertain, with greater preciseness, grade level equivalencies and areas requiring special emphasis.

Grade level gains for Fifth Grade Program children were noted between .1 to 2.1. Excellent gains were found in reading among Fifth Grade children in the San Rafael and Sierra Vista Schools. Program Children in both of the schools attained Sixth Grade reading level in the Spring of 1974. This achievement

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also was noted among non-program children in the Mesa View School. Based on this finding (measured by the reading component of the SRA Test), the reading program in English appears to be highly effective. Instructional processes in these classrooms, with particular reference to reading development in English, are suggested for review and consideration as models for teachers who are experiencing difficulties in their reading programs.

The grade level gains in language grammar and mathematics are comparably lower than reading. Except for program children in the Sierra Vista School, these gains are below 1.0. In both of these categories, special attention will be needed to raise the average achievement of the groups to correspond to grade level readings. Again, it is suggested that program teachers review other available data or administer additional tests in the Fall to ascertain with greater specificity areas in the language arts and mathematical processes that will require special instructional emphasis.

Additional statistical analyses were performed to determine any difference in subject-matter achievement between program and non-program students in grades 1, 3, 5. The purpose in undertaking these analyses was to ascertain any learning effects

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(positive or negative) among program children in several subject-matter areas of the English-based curriculum. Table V gives evidence that First Grade Program children in the Sierra Vista and San Rafael sampling groups scored approximately .8 (grade level points) below non-program children in the Mesa View School. This is especially apparent among Spanish surnamed children. Further review of available data or additional testing is suggested to ascertain the generalizability of this findings in reference to all First Grade program children.

The abovementioned finding does not hold true for Third Grade Children in the Bilingual-Bicultural Education Program. These students achieved comparable or higher scores than non-program children in reading, language grammar, and mathematical concepts. Based on this finding, it may be concluded that any interference effects experienced by First Grade children in the bilingual education program tend to diminish or disappear by the end of the third year of schooling. This statistical comparison also holds true for Fifth Grade students in the program. Table VII shows that program student (Fifth Grade) means and level equivalencies are either closely related or generally in favor of students in the program. This finding clearly supports the notion that bilingual-bicultural instruction does not produce

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retardation in reading, language grammar, mathematics, social studies, and science based in English. This is a finding that should be presented to parents and educators, for it will serve to allay any fears that bilingual-bicultural instruction may tend to retard the learning process in English-based subject-matter areas.

Personnel Perceptions and Attitudes About the Program

A questionnaire composed of 30 questions about the program was distributed to personnel in the Grants Bilingual-Bicultural Education Program. Twenty one persons (teachers, paraprofessionals, and administrators) in the program returned the questionnaire, which actually represents a 100 percent response. Table VIII in the Appendices shows the tabulated data of positive and negative responses to the 30 questions. The statistical data reveal a majority of favorable responses about the program. In general, program personnel feel that the program is well coordinated, sufficiently supplied with materials and equipment, and effective in developing the bilingual ability and cognitive skills of children in the program.

Only eight questions show 5 or more negative responses. These have been analyzed and herewith presented for program personnel to review. Questions 2-5 refer to the adequacy

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or relevancy of Spanish language materials in mathematics, social studies, science, and aesthetic concepts. Six out of 20 teachers and paraprofessionals indicated a need for increased adequacy and relevancy in Spanish social studies materials, 6 out of 20 respondents noted a need for greater adequacy and relevancy in Spanish mathematics materials, and 5 out of 20 respondents indicated a need for greater adequacy in Spanish science and aesthetic materials. Nine out of 21 respondents noted that existing materials in Spanish do not adequately represent the Southwestern Hispanic cultural heritage of children in the program. Eight of 21 respondents indicated that children are still not using Spanish in informal situations. The majority of the respondents (15 out of 20) noted that greater parental and community support for the program is needed. And seven out 17 respondents indicated that they are not using selected or teacher-prepared tests for diagnostic purposes.

The majority of the respondents indicated that a sufficient quantity of Spanish language materials are available. It appears, however, that questions about the materials relate to relevancy in terms of content and related exercises.

The questionnaire data lend further support to observational reports relative to the meaningful and stimulating materials

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developed by teachers and paraprofessionals in the program. Many pictorials, objects, and other materials used in the learning activities favorably depict cultural features found among Spanish-surnamed and Native American students in the program. The responses to questions about the receptivity of children in learning Spanish and their attitudes toward native cultural references were unanimously favorable.

All of the respondents indicated that pupil interaction has increased as a result of bilingual-bicultural interaction. Similar indications were reported by classroom observers in a visitation to the schools in February, 1974. Furthermore, all of the respondents indicated an increase in confidence of children in terms of themselves and significant others. These findings give evidence that the program objectives of enhancing children's attitudes about their own cultural heritage, about themselves, and significant others are being effectively carried by personnel in the program.

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SUMMARY AND RECOMMENDATIONS

Due to budgetary limitations, this year's evaluation study included 9 classroom groups (6 program and 3 non-program) in the Grants Bilingual-Bicultural Education. As additional grade levels and classrooms are incorporated in bilingual-bicultural education programs, increased budgetary allowances are needed for overall coverage in the evaluation process. Otherwise, evaluation plans must be designed to accommodate a sampling of schools and classrooms in the program. In this respect, the 1973-74 evaluation plan for the Grants Bilingual-Bicultural program was designed to obtain program and non-program data in grades 1, 3, and 5 in the San Rafael, Sierra Vista, and Mesa View (control group) schools. In reference to the statistical tables, it appears that sufficient data was collected to present noteworthy findings and recommendations.

The statistical data show that students in the program continue to advance in Spanish reading vocabulary, reading rate and comprehension. A supplementary analysis of the data revealed that acceleration in language development is dependent on degree and frequency of exposure to that language in both school and home environments.

In previous evaluation studies, students in the Grants Bilingual-Bicultural Education Program were observed

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reading orally and responding to questions relative to reading content. The statistical findings in the study give further evidence that students in the program are reading in Spanish and comprehending what they read.

The results of the General Ability Test in the Inter-American Test Series clearly show that students in the program have gained significantly in oral vocabulary, numbers, general concepts, and cognitive processes (associations and classifications) based on verbal and pictorial stimuli given in Spanish. The findings based on this test also give credence to the importance of relating test design to content in terms of growth and development concepts at various age levels, as well as to the type of stimuli and learning processes that children have experienced in the instuctional program. Classroom observations provided additional evidence that teachers in the program are advancing the oral language ability and cognitive skills of children in the program.

The SRA Test for Grade 3 students was administered to ascertain achievments in reading, language grammar, and mathematical concepts based in English. All of the Third Grade children tested measured at or beyond grade level in terms of the SRA Test. Grade level gains for Fifth Grade program children were noted between .1 to 2.1. Excellent gains were found in reading

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among Fifth Grade (Program) children. Fifth Grade children in both of the program schools attained Sixth Grade reading level in the Spring of 1974. This achievement also was noted among non-program children in the Mesa View School. Based on this finding (measured by the reading component of the SRA Test), the reading program in English appears to be highly effective.

Grade level gains in language grammar and mathematics are comparably lower than reading. Except for program children in the Sierra Vista School, these gains are below 1.0. In both of these categories, special attention will be needed to raise the average achievement of the groups to correspond to grade level readings.

Additional statistical analyses were performed to determine any differences in (English) subject-matter achievement between program and non-program students in grades 1, 3, and 5. Table V gives evidence that First Grade Program children in the two schools of this study scored approximately .8 (grade level points) below non-program children in the Mesa View School. Further review of available data or additional testing is suggested to ascertain the generalizability of this finding in reference to all First Grade Program children.

The abovementioned finding does not hold true for Third Grade children in the program. These students achieved comparable or

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higher scores than non-program children in reading, language grammar, and mathematical concepts in English. Based on this finding, it may be concluded that any interference effects experienced by children in the program tend to diminish or disappear by the end of the third year of schooling.

Program personnel responses noted in a questionnaire composed of 30 questions show that the respondents, in general, feel that the program is well coordinated, sufficiently supplied with materials and equipment, and effective in developing the bilingual ability and cognitive skills of children in the program. The respondents would like to obtain Spanish materials in science, social studies, aesthetics, and mathematics with greater relevancy to the language needs and native cultural references of Spanish surnamed and Native American children in the Grants schools. The questionnaire data lend further support to observational reports relative to the meaningful and stimulating materials developed by program personnel.

The majority of the respondents feel that the program has affected an increase in interaction, self-confidence, favorable attitudes towards others, and positive attitudes towards native cultural features among program children. These data, coupled with classroom observational reports, give evidence that program

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objectives related to the abovementioned variables in the affective domain are being effectively carried by program personnel.

Other statistical findings reveal a need for increased support and involvement by parents and the total community, greater application of diagnostic tests to ascertain specific areas for instructional emphases in terms of individual and group needs, and a continuation of inservice training to exchange ideas and provide exemplary instructional models (i.e., reading) that have proven highly advantageous in advancing the achievement level of students in the program.

The foregoing findings reveal that the Grants Bilingual-Bicultural Education Program is meeting the majority of its objectives. It is significantly advancing students bilingually. Additionally, it is furthering the overall growth and development of children both cognitively and affectively. Variables specifically related to both of these learning domains are described in the study in terms of the results obtained through the measuring instruments, classroom observations, and interviews. It is highly recommended that the Grants Bilingual-Bicultural Education be continued, for it already is showing excellent programmatic components that many school systems with comparable population groups may want to consider for implementation.

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APPENDICES

Statistical Tables

TABLE I: Spanish Language Reading Achievement.

School	Grade Level	Ethnic Group	N	Variable	Post-Test Mean	Percentage Score
San Rafael	1	Mixed	S.S.=8 A.S.=2	Reading Voc.	23.2	58.0
San Rafael	1	Mixed	S.S.=8 A.S.=2	Reading Comp.	23.4	58.5
Sierra Vista	1	Mixed	S.S.=18 A.S.=2	Reading Voc.	14.4	35.0
Sierra Vista	1	Mixed	S.S.=18 A.S.=2	Reading Comp.	11.2	28.0
San Rafael	3	Mixed	S.S.=6 A.S.=4	Comp. Rate	17.7	44.2
				Comp. Level	30.0	75.0
San Rafael	3	Mixed	S.S.=6 A.S.=4	Reading Voc.	22.7	56.8
Sierra Vista	3	Mixed	S.S.=19 A.S.=1	Comp. Rate	7.9	19.8
				Comp. Level	12.5	31.3
Sierra Vista	3	Mixed	S.S.=19 A.S.=1	Reading Voc.	10.0	25.0

S.S. = Spanish Surnamed Children

A.S. = Anglo Surnamed Children

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TABLE I: Continued

School	Grade Level	Ethnic Group	N	Variable	Post-Test Mean	Percentage Score
San Rafael	5	Mixed	S.S.=9 A.S.=1	Reading Voc.	7.9	17.6
San Rafael	5	Mixed	S.S.=9 A.S.=1	Reading Rate	4.3	14.3
San Rafael	5	Mixed	S.S.=9 A.S.=1	Reading Comp. Level	10.0	20.0
Sierra Vista	5	Mixed	S.S.=19 A.S.=1	Reading Voc.	7.9	17.6
Sierra Vista	5	Mixed	S.S.=19 A.S.=1	Reading Rate	5.4	18.0
Sierra Vista	5	Mixed	S.S.=19 A.S.=1	Reading Comp. Level	9.8	19.6

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TABLE II: Spanish Language Achievement in Oral Vocabulary, Numbers, Associations, and Classifications.

School	Grade Level	Ethnic Group	N	Variable	Post-Test Mean	Percentage Score
San Rafael	1	Combined	S.S.=8 A.S.=2	Oral Voc.	14.1	56.4
San Rafael	1	Combined	S.S.=8 A.S.=2	Numerical	12.1	80.7
San Rafael	1	Combined	S.S.=8 A.S.=2	Association	13.9	69.5
San Rafael	1	Combined	S.S.=8 A.S.=2	Classific.	12.4	62.0
Sierra Vista	1	Combined	S.S.=18 A.S.=2	Oral Voc.	17.1	68.0
Sierra Vista	1	Combined	S.S.=18 A.S.=2	Numerical	8.7	58.0
Sierra Vista	1	Combined	S.S.=18 A.S.=2	Association	16.9	84.5
Sierra Vista	1	Combined	S.S.=18 A.S.=2	Classific.	13.5	67.5

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TABLE III: Third Grade (English) Achievement in Reading, Language Arts, and Arithmetic.

School	Grade Level	Cult. Group	N	Variable	Pre-/Post Test Mean	Grade Level Eq.	Grade Level Points Gained
San Rafael	3	S.S	9/16	Reading	N/A	2.2 4.1	1.9
San Rafael	3	A.S.	3/4	Reading		2.9 4.2	1.3
San Rafael	3	S.S.	9/6	Lang.		2.6 4.7	2.1
San Rafael	3	A.S.	3/4	Lang.		2.7 4.5	1.8
San Rafael	3	S.S.	9/6	Arith.		2.6 4.5	1.9
San Rafael	3	A.S.	3/4	Arith.		2.6 4.5	1.9
Sierra Vista	3	S.S.	16/19	Reading		2.2 3.2	1.0
Sierra Vista	3	A.S.	2/1	Reading		1.6	
Sierra Vista	3	S.S.	16/19	Lang.		2.2 2.9	.7
Sierra Vista	3	A.S.	2/1	Lang.		2.3	
Sierra Vista	3	S.S.	16/19	Arith.		2.4 3.2	.8
Sierra Vista	3	A.S.	2/1	Arith.		2.4	
Mesa View	3	S.S.	15/19	Arith.		2.6 3.2	.6
Mesa View	3	A.S.	11/1	Arith.		2.4	
Mesa View	3	S.S.	15/19	Arith.		2.1 3.1	1.0
Mesa View	3	A.S.	11/1	Arith.		2.2	
Mesa View	3	S.S.	15/19	Arith.		2.8 2.9	
Mesa View	3	A.S	11/1	Arith		2.3	

N/A= Not Applied

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TABLE IV: Fifth Grade (English) Achievement in Reading, Language Arts, and Mathematics

School	Grade Level	Cult. Group	N	Variable	Pre/Post Test Grade Eq.	Grade Level Eq. Diff.
San Rafael	5	S.S.	10	Reading	4.2	
		S.S.	9		6.2	2.0
San Rafael	5	S.S.	10	Language	4.4	
		S.S.	9	Arts	4.3	.1
San Rafael	5	S.S.	10	Math	4.3	
		S.S.	9		5.1	.8
Sierra Vista	5	S.S.	16	Reading	3.8	
		S.S.	18		6.4	1.6
Sierra Vista	5	S.S.	16	Language	3.4	
		S.S.	18	Arts	5.5	2.1
Sierra Vista	5	S.S.	16	Math	3.9	
		S.S.	18		5.1	1.2
Mesa View	5	S.S.	5	Reading	4.7	
		S.S.	19		6.2	1.5
Mesa View	5	S.S.	5	Language	4.3	
		S.S.	19	Arts	5.1	.8
Mesa View	5	S.S.	5	Math	5.2	
		S.S.	19		5.4	.2

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TABLE V: Comparative (English) Achievement of Program and Non-Program First Grade Children in Reading, Language Grammar, and Mathematics.

School	Grade Level	Cult. Group	N	Variable	Post-Test Mean	Mean Diff.	Grade Level Eq.	Grade Level Diff.
San Rafael	1	S.S.	8	Reading	13.9	-4.0	1.0	-.9
Mesa View	1	S.S.	18		19.9		1.9	
	1	A.S.	2	Reading	14.5	-1.0	1.0	.0
	1	A.S.	2		13.5		1.0	
Sierra Vista	1	S.S.	18	Reading	14.9	-5.0	1.1	-.8
Mesa View	1	A.S.	18		19.9		1.9	
	1	A.S.	2	Reading	29.5	16.0	2.5	1.5
	1	A.S.	2		13.5		1.0	
San Rafael	1	S.S.	8	Language	24.9	-10.7	1.0	-.8
Mesa View	1	S.S.	18	Arts	35.6		1.8	
	1	A.S.	2	Language	26.0	-1.0	1.0	-.1
	1	A.S.	2	Arts	27.0		1.1	
Sierra Vista	1	S.S.	18	Language	22.0	-13.6	1.0	-.8
Mesa View	1	S.S.	18	Arts	35.6		1.8	
	1	A.S.	2	Language	43.5	16.5	2.3	1.2
	1	A.S.	2	Arts	27.0		1.1	
San Rafael	1	S.S.	8	Math	19.4	-7.4	1.2	-.5
Mesa View	1	S.S.	18		26.8		1.7	
	1	A.S.	2	Math	20.5	-1.0	1.3	- .2
	1	A.S.	2		21.5		1.5	
Sierra Vista	1	S.S.	18	Math	18.9	-7.9	1.2	-.5
Mesa View	1	S.S.	18		26.8		1.7	
	1	A.S.	2	Math	29.5	8.0	1.9	.4
	1	A.S.	2		21.5		1.5	

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TABLE VI: Comparative (English) Achievement of Program and Non-Program Third Grade Children in Reading, Language Grammar, and Mathematics.

School	Grade Level	Cult Group	N	Variable	Post-Test Mean	Mean Diff.	Grade Level Eq.	Grade Level Diff.
San Rafael	3	S.S.	6	Reading	38.6	10.7	4.1	
Mesa View	3	S.S.	19		27.9		3.2	.9
San Rafael	3	A.S.	4	Reading	41.7	—	4.2	—
Mesa View	3	A.S.	1		—		—	
Sierra Vista	3	S.S.	19	Reading	27.7	-.2	3.2	.0
Mesa View	3	S.S.	19		27.9		3.2	
Sierra Vista	3	A.S.	1	Reading	—	—	—	—
Mesa View	3	A.S.	1		—		—	
San Rafael	3	S.S.	6	Language Arts	55.8	18.1	4.7	1.6
Mesa View	3	S.S.	19		37.7		3.1	
San Rafael	3	A.S.	4	Language Arts	54.0	—	4.5	—
Mesa View	3	A.S.	4		—		—	
Sierra Vista	3	S.S.	19	Language Arts	37.0	-.7	2.9	-.2
Mesa View	3	S.S.	19		37.7		3.1	
Sierra Vista	3	A.S.	1	Language Arts	—	—	—	—
Mesa View	3	A.S.	1		—		—	
San Rafael	3	S.S.	6	Math	46.5	17.1	4.5	1.6
Mesa View	3	S.S.	19		29.4		2.9	
San Rafael	3	A.S.	4	Math	47.0	—	4.5	—
		A.S.	4		—		—	
Sierra Vista	3	S.S.	19	Math	32.4	3.0	3.2	.3
Mesa View	3	S.S.	19		29.4		2.9	
Sierra Vista	3	A.S.	1	Math	—	—	—	—
Mesa View	3	A.S.	1		—		—	

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TABLE VII: Comparative (English) Achievement of Program and Non-Program Fifth Grade Children in Reading, Language Arts, Vocabulary, Mathematics, Social Studies, and Science.

School	Grade Level	Cult Group	N	Variable	Post-Test Mean	Mean % Diff.	Grade Level Eq.	Grade Level Diff.
San Rafael	5	S.S.	9	Reading	30.9	.0	6.2	.0
Mesa View	5	S.S.	19		30.9		6.2	
San Rafael	5	A.S.	1	Reading	----	----	----	----
Mesa View	5	A.S.	1					
Sierra Vista	5	S.S.	18	Reading	31.0	.1	6.4	.2
Mesa View	5	S.S.	19		30.9		6.2	
Sierra Vista	5	A.S.	2	Reading	----	----	----	----
Mesa View	5	A.S.	1					
San Rafael	5	S.S.	9	Language Arts	33.2	-5.8	4.3	-.8
Mesa View	5	S.S.	19		39.0		5.1	
San Rafael	5	A.S.	1	Language Arts	----	----	----	----
Mesa Vista	5	A.S.	1					
Sierra Vista	5	S.S.	18	Language Arts	43.5	4.5	5.5	.4
Mesa View	5	S.S.	19		39.0		5.1	
Sierra Vista	5	A.S.	2	Language Arts	----	----	----	----
Mesa View	5	A.S.	1					
San Rafael	5	S.S.	9	Voc.	16.4	-.4	3.8	-.1
Mesa View	5	S.S.	19		16.8		3.9	
San Rafael	5	A.S.	1	Voc.	----	----	----	----
Mesa View	5	A.S.	1					
Sierra Vista	5	S.S.	18	Voc.	14.3	-2.5	3.4	-.5
Mesa View	5	S.S.	19		16.8		3.9	
Sierra Vista	5	A.S.	2	Voc.	----	----	----	----
Mesa View	5	A.S.	1					

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TABLE VII: Continued

School	Grade Level	Cult. Group	N	Variable	Post-Test Mean	Mean % Diff.	Grade Level Eq.	Grade Level Diff.
San Rafael	5	S.S.	9	Math.	20.1	-2.3	5.1	-.3
Mesa View	5	S.S.	19	Math.	22.4		5.4	
San Rafael	5	A.S.	1	Math.	------	------	------	------
Mesa View	5	A.S.	1	Math.				
Sierra Vista	5	S.S.	18	Total Math.	40.5	NA	5.1	-NA
Mesa View	5	S.S.	19	Math Concepts Only	22.4		5.4	
Sierra Vista	5	A.S.	2	Math	-----	-----	-----	-----
Mesa View	5	A.S.	1	Math				
San Rafael	5	S.S.	9	Social	20.8	2.7	3.9	.5
Mesa View	5	S.S.	19	Science	18.1		3.4	
San Rafael	5	A.S.	1	Social	----	---	------	------
Mesa View	5	A.S.	1	Science				
Sierra Vista	5	S.S.	18	Social	17.0	-1.1	3.2	-.2
Mesa View	5	S.S.	19	Science	18.1		3.4	
Sierra Vista	5	A.S.	2	Social	------	-------	-------	-------
Mesa View	5	A.S.	1	Science				
San Rafael	5	S.S.	9	Science	20.3	4.8	3.7	.9
Mesa View	5	S.S.	19		15.5		2.8	
San Rafael	5	A.S.	1	Science	------	-----	------	------
Mesa View	5	A.S.	1					
Sierra Vista	5	S.S.	18	Science	14.2	-1.3	2.4	-.4
Mesa View	5	S.S.	19		15.5		2.8	
Sierra Vista	5	A.S.	2	Science	----	----	------	------
Mesa View	5	A.S.	1					

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TABLE VIII: Questionnaire Responses in Terms of Personnel Perceptions and Attitudes About the Program.

Questions	Yes	No
1.	18	3
2.	14	6*
3.	12	8*
4.	13	5*
5.	15	5*
6.	19	3
7.	18	3
8.	12	9*
9.	20	2
10.	19	1
11.	20	2
12.	16	4*
13.	16	2
14.	16	2
15.	14	4*
16.	15	3
17.	15	3
18.	16	2
19.	16	2
20.	21	0

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*Asterisk denotes questions with 4 or more negative responses.

TABLE VIII: Continued

Questions	Yes	No
21.	19	1
22.	13	8*
23.	20	0
24.	19	0
25.	5	15*
26.	19	3
27.	10	7*
28.	3	19**
29.	21	2
30.	15	1

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** Question 28, if answered negatively, is highly favorable to the program.
The question is: "Do you find that bilingual education retards the cognitive development of the child?".